

Applicant: Toshimi MATSUMOTO, et al.

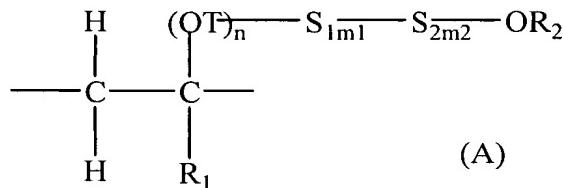
Office Action Mailing Date: October 5, 2007

Response to Office Action Submitted: February 5, 2008

### AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

1. (Currently Amended) A cement additive containing copolymers comprising one or more constitutional units represented by formula A:



wherein

$\text{R}_1$  is hydrogen, an alkyl group having 1 to 4 carbon atoms, an alkenyl group having 1 to 4 carbon atoms or an aryl group having 6 to 9 carbon atoms;

$\text{R}_2$  is hydrogen or an alkyl group having 1 to 9 carbon atoms, an alkenyl group having 1 to 9 carbon atoms or an aryl group having 6 to 9 carbon atoms;

$\text{T}$  is alkylene having 1 to 4 carbon atoms, wherein the alkylene may include straight-chain alkylene or branched alkylene or arylene having 6 to 9 carbon atoms;

$n$  is 0 or 1;

$\text{S}_1$  and  $\text{S}_2$  are, independently of one another,  $-\text{OC}_k\text{H}_{2k-}$  or  $-\text{OCH}_2\text{CHR}_3-$ , wherein  $k$  is 2 or 3,  $\text{R}_3$  is an alkyl group having 1 to 9 carbon atoms, an aryl group having 6 to 9 carbon atoms; and

$6 \leq m_1 + m_2 \leq 25$ ;

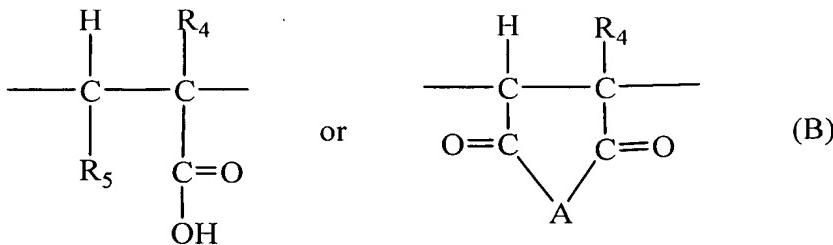
and

one or more constitutional units represented by formula B:

Applicant: Toshimi MATSUMOTO, et al.

Office Action Mailing Date: October 5, 2007

Response to Office Action Submitted: February 5, 2008



wherein

 $R_4$  is hydrogen or a methyl group; $R_5$  is hydrogen or a group represented by  $COOY$ ;

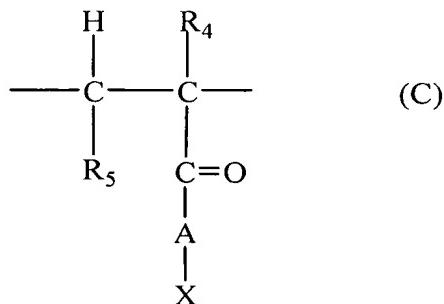
$Y$  is hydrogen, an aliphatic hydrocarbon group having 1 to 8 carbon atoms, wherein the aliphatic hydrocarbon group may include straight-chain, branched, saturated or unsaturated groups, a cyclic hydrocarbon group having 3 to 8 carbon atoms, wherein the cyclic hydrocarbon group may include straight-chain, branched, saturated or unsaturated groups, a hydroxyalkyl group having 2 to 5 carbon atoms, wherein the hydroxyalkyl group may include branched groups, a hydroxyalkenyl group having 2 to 5 carbon atoms, alkali metal or alkaline earth metal, an ammonium group derived from alkylamine having 1 to 20 carbon atoms, alkanolamine having 1 to 20 carbon atoms, cycloalkylamine having 5 to 8 carbon atoms, or arylamine having 6 to 14 carbon atoms;

 $A$  is oxygen or  $NR_6$ ; and

$R_6$  is hydrogen, an alkyl group having 1 to 20 carbon atoms, an aryl group having 6 to 20 carbon atoms, a sulfonyl group or a sulfanyl group;

and

one or more constitutional units represented by formula C:



wherein

R<sub>4</sub> is hydrogen or a methyl group;

R<sub>5</sub> is hydrogen or a group represented by COOY;

A is oxygen or NR<sub>6</sub>;

X is an aliphatic hydrocarbon group having 1 to 8 carbon atoms, wherein the aliphatic hydrocarbon group may include straight-chain, branched, saturated or unsaturated groups, a cyclic hydrocarbon group having 3 to 8 carbon atoms, wherein the cyclic hydrocarbon group may include straight-chain, branched, saturated or unsaturated groups, a hydroxyalkyl group having 2 to 5 carbon atoms, wherein the hydroxyalkyl group may include branched groups, a hydroxyalkenyl group having 2 to 5 carbon atoms, alkali metal or alkaline earth metal, an ammonium group derived from alkylamine having 1 to 20 carbon atoms, alkanolamine having 1 to 20 carbon atoms, cycloalkylamine having 5 to 8 carbon atoms, or arylamine having 6 to 14 carbon atoms;

and wherein the cement additive comprises copolymers wherein the mole ratio of the constitutional units A and C is  $0.1 \leq A/C \leq 1$  and the mole ratio of the constitutional units B and C is  $B/C \leq 1$ , and copolymers wherein the mole ratio of the constitutional units A and C is  $A/C > 1$  and the mole ratio of the constitutional units B and C is  $1 < B/C \leq 20$ .

2. (Currently Amended) The cement additive according to claim 1 wherein the weight average molecular weight of the copolymers is 5,000 to 50,000.

3. (Cancelled)

4. (Cancelled)

5. (Cancelled)

6. (Cancelled)

Applicant: Toshimi MATSUMOTO, et al.

Office Action Mailing Date: October 5, 2007

Response to Office Action Submitted: February 5, 2008

7. (Currently Amended) The cement additive according to claim [[6]]1 comprising copolymers wherein the mole ratio of the constitutional units A and C is  $0.1 \leq A/C \leq 1$  and the mole ratio of the constitutional units B and C is  $B/C \leq 1$ , and copolymers wherein the mole ratio of the constitutional units A and C is  $A/C > 1$  and the mole ratio of the constitutional units B and C is  $1 < B/C \leq 20$  in a ratio of 20:80 to 99:1.

8. (Currently Amended) The cement additive according to claim 1 further comprising one or more of additive I selected from the group consisting of ~~polycarboxylic acid-type~~ copolymers comprising vinyl alcohol; polycarboxylic acid type copolymers; copolymers of alkyl vinyl ether and acrylic acid derivatives; copolymers of hydroxyalkyl vinyl ether and acrylic acid derivatives; copolymers of vinyl alcohol derivatives and acrylic acid derivatives; copolymers of vinyl ether, acrylic acid and maleic acid; copolymers of allyl ether and maleic anhydride; copolymers of allyl ether, maleic anhydride and maleic acid ether; copolymers of methacrylate alkylene oxide ether and methacrylic acid; copolymers of methacrylate alkylene oxide ether and acrylic acid; maleic acid esters; copolymers of maleic acid and styrene; ligninsulfonic acid; polymelaminesulfonic acid; bis-naphthalenesulfonic acid and gluconic acid.

9. Cancelled.

10. Cancelled.

11. (Original) The cement additive according to claim 8 comprising cement additive I, copolymers wherein the mole ratio of the constitutional units A and C is  $0.1 \leq A/C \leq 1$  and the mole ratio of the constitutional units B and C is  $B/C \leq 1$ , and copolymers wherein the mole ratio of the constitutional units A and C is  $A/C > 1$  and the mole ratio of the constitutional units B and C is  $1 < B/C \leq 20$ ; wherein cement additive I is comprised in a ratio of 1 to 99 wt% of the total amount of cement additives.

Applicant: Toshimi MATSUMOTO, et al.

Office Action Mailing Date: October 5, 2007

Response to Office Action Submitted: February 5, 2008

12. (Previously Amended) The cement additive according to claim 1 further comprising one or more of cement additive II selected from the group consisting of gluconic acid, sodium gluconate, saccharides, sugar alcohols, lignin, polycarboxylic acid, polyamide, polyamine, polyethoxyethylene, triethanolamine, polysaccharide derivatives, and lignin derivatives.

13. (Original) The cement additive according to claim 12 wherein cement additive II is 40 wt% or less of the total amount of cement additives.

14. (Previously Presented) The cement additive according to claim 1 further comprising at least one of air entraining agents, dry shrinkage reducing agents, accelerators, retarding agents, foaming agents, defoaming agents, rust preventing agents, quick setting agents, thickeners or water-soluble high molecular substances.

15. (Previously Presented) The cement additive according to claim 8 further comprising one or more of cement additive II selected from the group consisting of gluconic acid, sodium gluconate, saccharides, sugar alcohols, lignin, polycarboxylic acid, polyamide, polyamine, polyethoxyethylene, triethanolamine, polysaccharide derivatives, and lignin derivatives.

16. (Previously Presented) The cement additive according to claim 8 further comprising at least one of air entraining agents, dry shrinkage reducing agents, accelerators, retarding agents, foaming agents, defoaming agents, rust preventing agents, quick setting agents, thickeners or water-soluble high molecular substances.

17. (Previously Presented) The cement additive according to claim 1 wherein the copolymer further comprises a monomer that is at least one of unsaturated monocarboxylic acid derivatives, allyl alcohol acid derivatives, crotyl alcohol acid derivatives, or diesters of unsaturated dicarboxylic acids.

Applicant: Toshimi MATSUMOTO, et al.

Office Action Mailing Date: October 5, 2007

Response to Office Action Submitted: February 5, 2008

18. (Previously Presented) The cement additive of claim 1 wherein the copolymer comprises a constitutional unit A that is at least one of polyethylene glycol monovinyl ether or methylpolyethylene glycol monovinyl ether.

19. (Previously Presented) The cement additive according to claim 1 wherein the copolymer comprises a constitutional unit B that is at least one of methacrylic acid, maleic acid anhydride, maleic acid or acrylic acid.

20. (Previously Presented) The cement additive according to claim 1 wherein the copolymer comprises a constitutional unit C that is at least one of methyl (meth)acrylate, ethyl (meth)acrylate, isobutyl (meth)acrylate, n-butyl (meth)acrylate, hydroxypropyl (meth)acrylate, hydroxyethyl (meth)acrylate, or maleic acid dibutyl ester.

21. (New) The cement additive according to claim 1 comprising copolymers wherein the mole ratio of the constitutional units A and C is  $0.1 \leq A/C \leq 1$  and the mole ratio of the constitutional units B and C is  $B/C \leq 1$ , and copolymers wherein the mole ratio of the constitutional units A and C is  $A/C > 1$  and the mole ratio of the constitutional units B and C is  $1 < B/C \leq 20$  in a ratio of 50:50 to 80:20.